**[Billing Code 4140-01-P]**

**DEPARTMENT OF HEALTH AND HUMAN SERVICES**

**National Institutes of Health**

# Government-Owned Inventions; Availability for Licensing

**AGENCY:** National Institutes of Health, HHS.

**ACTION:** Notice.

**SUMMARY:** The inventions listed below are owned by an agency of the U.S. Government and are available for licensing in the U.S. in accordance with 35 U.S.C. 209 and 37 CFR Part 404 to achieve expeditious commercialization of results of federally-funded research and development. Foreign patent applications are filed on selected inventions to extend market coverage for companies and may also be available for licensing.

**FOR FURTHER INFORMATION CONTACT:** Licensing information and copies of the U.S. patent applications listed below may be obtained by writing to the indicated licensing contact at the National Heart, Lung and Blood Institute, Office of Technology Transfer and Development, National Institutes of Health, 31 Center Drive Room 4A29, MSC2479, Bethesda, MD 20892-2479; telephone: 301-402-5579. A signed Confidential Disclosure Agreement may be required to receive copies of the patent applications.

**SUPPLEMENTARY INFORMATION:** Technology descriptions follow.

## Microscopy Systems for Instant Internal Reflection Fluorescence/Structured Illumination

### Description of Technology:

Structured illumination microscopy (SIM) is a method that uses sharply patterned light and post-processing of images to enhance image resolution (in its linear form, doubling resolution). In traditional SIM, a series of images are acquired with a camera and computationally processed to improve resolution. This implementation of SIM has also been combined with total internal reflection fluorescence (TIRF), but the implementation still requires raw images relative to normal TIRF microscopy, thereby slowing acquisition 9-fold relative to conventional, diffraction-limited imaging. This TIRF/SIM system includes a radial aperture block positioned at a plane conjugate to the back focal plane of the objective lens, thus allowing only high-angle marginal annular light beams from a laser source to excite the sample. The radial aperture block can be replaced with a digital micromirror device for varying the evanescent wave to allow nanometric localization of features in the axial direction. A spatial light modulator (SLM) can be used to alter the phase of the excitation to optimally induce evanescent, patterned excitation at the sample. Various embodiments of the TIRF/SIM system allows for high-speed, super-resolution microscopy at very high signal-to-noise (SNR) ratios for biological applications within ~200 nm (e.g., the evanescent wave decay length) distance of a coverslip surface.

**Potential Commercial Applications:**

• High speed microscopy

**Competitive Advantages:**

• Low cost of manufacture

**Development Stage:**

• Prototype

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**Publications:**

1. Christensen RP, et al. Untwisting the Caenorhabditis elegans embryo. Elife. 2015 Dec 3;4. [PMID: 26633880]

2. Curd A., et al. Construction of an instant structured illumination microscope. Methods. 2015 Oct 15;88:37-47. [PMID: 26210400]

**Intellectual Property:** HHS Reference No. E-006-2016/0

• US Provisional Patent Application No. 62/378,307 filed 23 Aug 2016

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